Cell Biology

THE EFFECTS OF EXOGENOUS ETHANOL AND VITAMIN E ON SOD AND CATALSE ACTIVITIES IN DEVELOPING CHICK BRAIN AND LIVER

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Embryonic ethanol (EtOH) exposure is known to reduce the levels of brain polyunsaturated long-chain membrane fatty acids. These EtOH-induced membrane fatty acid changes correlate with EtOH-induced reductions in brain neuron densities within the cerebral hemispheres and optic lobes and increased levels of brain lipid hydroperoxide levels. Recent work has demonstrated that exogenous treatments of either α-tocopherol or γ-tocopherol attenuated EtOH-induced changes in membrane fatty acid composition and EtOH-induced changes in brain morphology. Thus, EtOH-impaired brain development appears to be associated with EtOH-induced lipid peroxidation.

At 0 days of development, fertile chick eggs were injected with a single dose of either saline, EtOH (6.05 mmol / kg egg), EtOH & α-tocopherol (6.05 mmol EtOH/ kg egg & 2.5 μmol α-tocopherol / kg egg), or EtOH & γ-tocopherol (6.05 mmol EtOH/ kg egg & 2.5 μmol γ-tocopherol / kg egg), At 18 days of development (embryonic chick brains and liver were removed and assayed for superoxide dimutase (SOD) activity and catalase (CATAL) activity. In embryonic chick liver, an EtOH-induced increase in SOD activity was observed while CATAL activity was unchanged as compared to controls. Exogenous vitamin-E treatments inhibited the EtOH-induced increases in liver SOD activity.